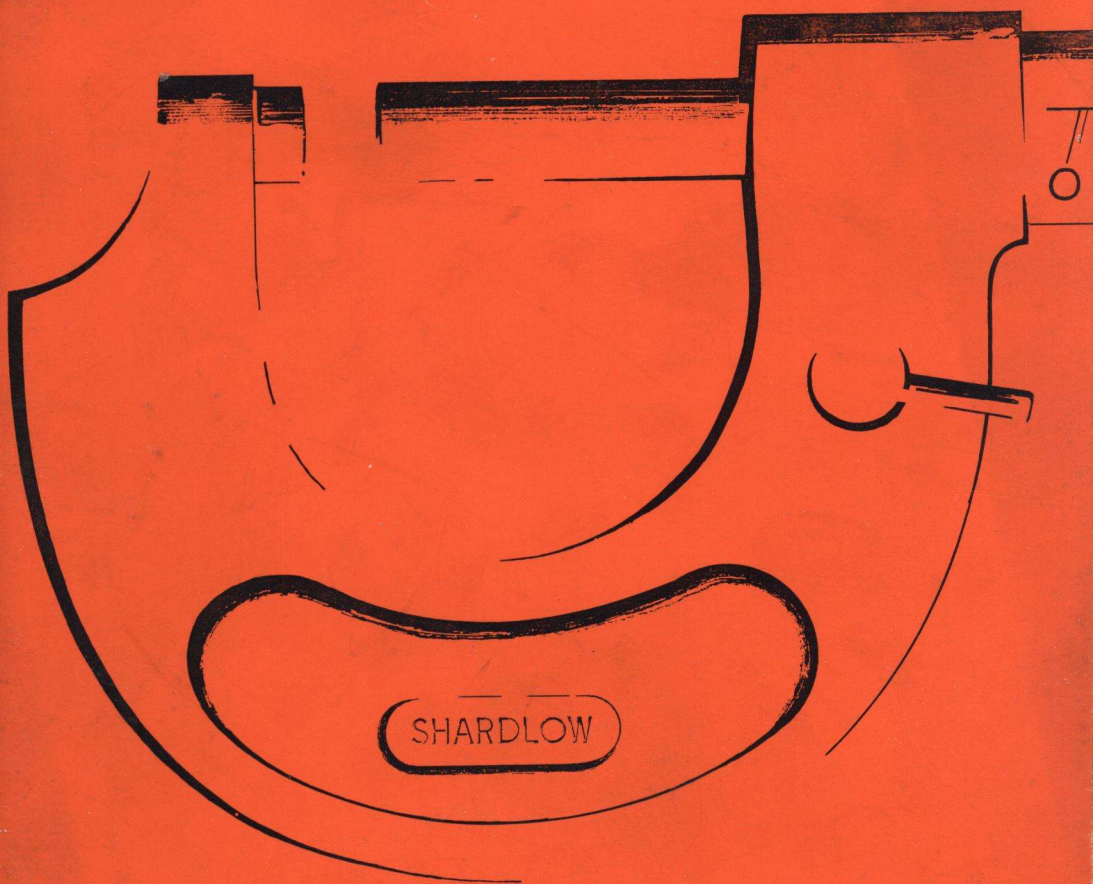


# SHARDLOW MICROMETERS

PRECISION  
MEASURING INSTRUMENTS



# STANDARDS ROOM STANDARDS ON THE SHOP FLOOR



Screws are  
thread ground  
in surroundings  
maintained  
at 68°F.

Time was when you made a trip to your Standards Room for a final decision on a component measurement. Today more and more engineers are discovering that when you really have to take a measurement 'for sure' it's just as reliable, and considerably quicker, to ask 'Has anyone in the shop got a Shardlow?'

Shardlow micrometers are built to an exceptional standard of accuracy — and constructed ruggedly to maintain that accuracy. And they are a real pleasure to use. Next time you pass your local tool shop call in and ask to see a Shardlow micrometer. Get the 'feel' of it in your hand. Compare it with other makes. You'll see that every feature is designed for easy, accurate, rapid reading: correct proportions for good balancing; new sleeve design with staggered inclined lines for precise readability; black figures on matt chrome for clear reading in any light.

Many engineering achievements could well carry the words 'Precision by Shardlow' for an increasing number of engineers rely on Shardlow instruments to uphold their reputation for accuracy. Many older engineers still swear by instruments made up to forty years ago by our parent company, Ambrose Shardlow & Co Ltd.

Produced in a modern factory, Shardlow micrometers have, since 1953, been made by Shardlow Micrometers Ltd, a vigorous self-supporting organisation.

Shardlow micrometers embody all that craftsmanship and constant development can give them — both in design and performance.

This leaflet shows part of the comprehensive range of Shardlow precision measuring instruments. Many more instruments are available while a special design service will produce the particular instrument to answer your needs.



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## EXTERNAL MICROMETERS

### Capacity 0-1" (0-25 mm.)

Shardlow English reading micrometers offer the extra precision of reading to 0.0005" at no extra cost. All 1" (25 mm.) micrometers have a cutaway frame to assist measurement in awkward conditions and are supplied in cases complete with adjusting keys. Sleeves and thimbles are matt chrome plated. Decimal equivalents are engraved on all English thimbles.

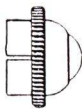
The micrometer shown features oblique markings on the sleeve to prevent misreadings of .025" (or 5 mm.).



No. 299 : .250" ball diameter

No. 299M: 6.5 mm.

### Ball anvil attachment



This attachment is easily fitted to 1" (25 mm.) micrometers and enables these instruments to be used for measuring tube walls. The ball diameter must be subtracted from the actual readings obtained.

# EXTERNAL MICROMETERS

## 1" (25 mm.) measuring range

Range 0-1" has a bow shaped frame.  
 Ranges 1-12" have square shaped frames.  
 Ranges over 12" have bow shaped alloy frames.  
 All micrometers are fitted with ratchet stops and locknuts. Sleeves and thimbles are matt chrome plated. Micrometers over 1" supplied in wooden case complete with adjusting key.

### ENGLISH:

·0005" graduations

Cat. No.	Capacity
4	0- ½"
50	0- 1"
51	1- 2"
52	2- 3"
53	3- 4"
54	4- 5"
55	5- 6"
56	6- 7"
57	7- 8"
58	8- 9"
59	9-10"
60	10-11"
61	11-12"
62	12-13"
63	13-14"
64	14-15"
65	15-16"
66	16-17"
67	17-18"
68	18-19"
69	19-20"
70	20-21"
71	21-22"
72	22-23"
73	23-24"

### METRIC:

·01 mm. graduations

Cat. No.	Capacity
4M	0- 13 mm.
50M	0- 25 mm.
51M	25- 50 mm.
52M	50- 75 mm.
53M	75-100 mm.
54M	100-125 mm.
55M	125-150 mm.
56M	150-175 mm.
57M	175-200 mm.
58M	200-225 mm.
59M	225-250 mm.
60M	250-275 mm.
61M	275-300 mm.
62M	300-325 mm.
63M	325-350 mm.
64M	350-375 mm.
65M	375-400 mm.
66M	400-425 mm.
67M	425-450 mm.
68M	450-475 mm.
69M	475-500 mm.
70M	500-525 mm.
71M	525-550 mm.
72M	550-575 mm.
73M	575-600 mm.

We recommend the purchase of a reference rod with each instrument to check the setting periodically.  
 When ordering add R to the catalogue No.  
 English calibrations can be supplied to read to ·0001" at extra cost. Add V to the catalogue No.  
 Micrometers can be supplied with tungsten carbide tips at extra cost. Add T before catalogue No.  
 Micrometers up to 12" capacity can be supplied with a check reading thimble at extra cost.  
 Add C to catalogue No.





## EXTERNAL MICROMETERS

### Matt chrome plated

Fitted with ratchet stop and locknut.  
English calibrations can be supplied to read to  
·0001" at extra cost. Add V to the catalogue No.

ENGLISH: ·0005" graduations

Cat. No.	Capacity
1	0-1"
2	1-2"
3	2-3"

METRIC: ·01 mm. graduations

Cat. No.	Capacity
1M	0-25 mm.
2M	25-50 mm.
3M	50-75 mm.

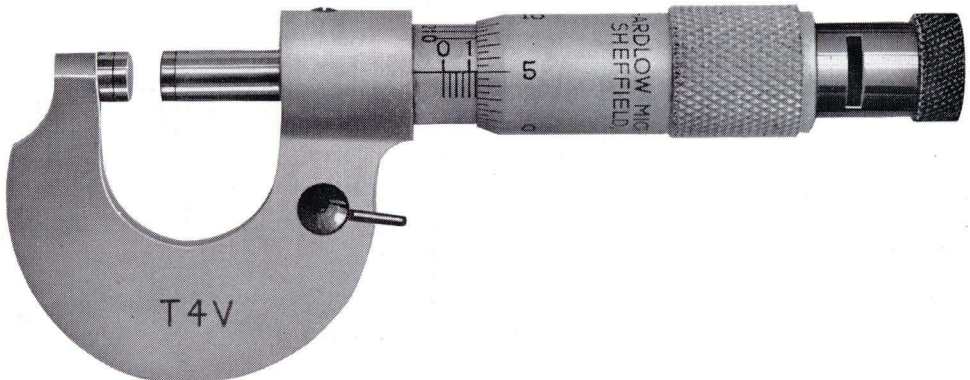


## EXTERNAL MICROMETERS

### Tungsten tips

The following micrometers can be fitted with  
tungsten carbide tips at extra cost:  
Standard flat anvil micrometers.  
Point anvil and spindle micrometers.  
Spline anvil and spindle micrometers.  
Ball ended micrometers.

When ordering micrometers with  
tungsten tips add T before the  
catalogue No.



## REFERENCE MEASURING RODS

We recommend the purchase of a reference measuring rod with each external micrometer so that the setting may be periodically checked. The 1" and 25 mm. standards are in the form of a disc. 2" up to 16" (50 mm. up to 400 mm.) are made as  $\frac{5}{16}$ " diameter rods. Above 16" (400 mm.) the diameter is  $\frac{3}{8}$ ".



Measuring rods are of non-shrinking steel, hardened and spherically lapped on the ends and fitted with heat insulating sleeves to prevent expansion when held in the hand. They conform to B.S. 870. Measuring rods over 24" (600 mm.) and measuring rods over 2" (50 mm.) with flat ends will be supplied on request.

Cat. No.	Size	Cat. No.	Size
125/1	1"	125/1M	25 mm.
125/2	2"	125/2M	50 mm.
125/3	3"	125/3M	75 mm.
125/4	4"	125/4M	100 mm.
125/5	5"	125/5M	125 mm.
125/6	6"	125/6M	150 mm.
125/7	7"	125/7M	175 mm.
125/8	8"	125/8M	200 mm.
125/9	9"	125/9M	225 mm.
125/10	10"	125/10M	250 mm.
125/11	11"	125/11M	275 mm.
125/12	12"	125/12M	300 mm.
125/13	13"	125/13M	325 mm.
125/14	14"	125/14M	350 mm.
125/15	15"	125/15M	375 mm.
125/16	16"	125/16M	400 mm.
125/17	17"	125/17M	425 mm.
125/18	18"	125/18M	450 mm.
125/19	19"	125/19M	475 mm.
125/20	20"	125/20M	500 mm.
125/21	21"	125/21M	525 mm.
125/22	22"	125/22M	550 mm.
125/23	23"	125/23M	575 mm.
125/24	24"	125/24M	600 mm.

## EXTERNAL MICROMETER SETS

Comprising 3, 6, 12 or 24 instruments, these sets are complete with reference disc and radial ended reference measuring rods in a polished oak case with lock and key.

Each instrument is fitted with ratchet stop and locknut. The graduated parts have a matt chrome finish for easier reading. 250 and 250M are supplied with matt chrome frames.

250, 251, 252, 250M, 251M and 252M are supplied in flat cases. 253, 254, 253M and 254M are supplied in upright cases. 255 and 255M are supplied in an oak drawer cabinet.

### ENGLISH:

·0005" graduations

Cat. No.	Capacity
250	0- 3"
251	0- 3"
252	0- 6"
253	6-12"
254	0-12"
255	0-24"

### METRIC:

·01 mm. graduations

Cat. No.	Capacity
250M	0- 75 mm.
251M	0- 75 mm.
252M	0-150 mm.
253M	150-300 mm.
254M	0-300 mm.
255M	0-600 mm.



English calibrations to read ·0001" supplied at extra cost; add V to the catalogue No. when ordering. All sets except 255 and 255M supplied with check reading thimble at extra cost; add C to catalogue No. All sets supplied with tungsten carbide tips at extra cost; add T before catalogue No.



## external interchangeable ANVIL MICROMETERS

### Capacities from 0-12"

ENGLISH: .0005" graduations

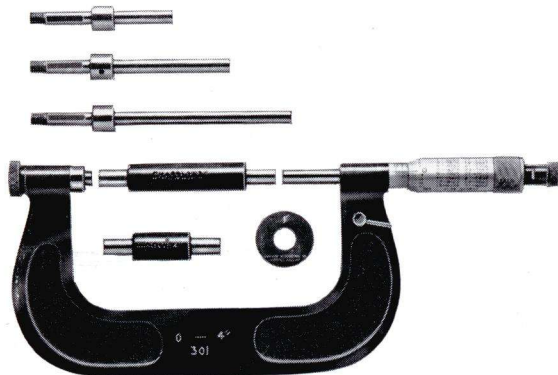
Cat. No.	Capacity
300	0-2"
301	0-4"
302	0-6"
303	2- 6"
304	4- 8"
305	6-12"
306	8-12"

METRIC: .01 mm. graduations

Cat. No.	Capacity
300M	0- 50 mm.
301M	0-100 mm.
302M	0-150 mm.
303M	50-150 mm.
304M	100-200 mm.
305M	150-300 mm.
306M	200-300 mm.

Each micrometer, fitted with ratchet stop and locknut and complete with a set of reference rods, is supplied in a wooden case.

These micrometers have square shaped frames. The interchangeable anvils are easily fitted and held in position by a knurled nut. The anvils are accurately positioned and each has an adjustment for wear. Adjustment can be made from the anvil end while retaining parallelism of the anvil and spindle faces.



## external interchangeable ANVIL MICROMETERS

### Capacities from 12 to 42"

ENGLISH: .0005" graduations

Cat. No.	Capacity
307	12-16"
308	16-20"
309	20-24"
310	24-30"
311	30-36"
312	36-42"

METRIC: .01 mm. graduations

Cat. No.	Capacity
307M	300- 400 mm.
308M	400- 500 mm.
309M	500- 600 mm.
310M	600- 750 mm.
311M	750- 900 mm.
312M	900-1050 mm.

Each micrometer, fitted with ratchet stop and locknut and complete with set of reference rods, is supplied in a wooden case.

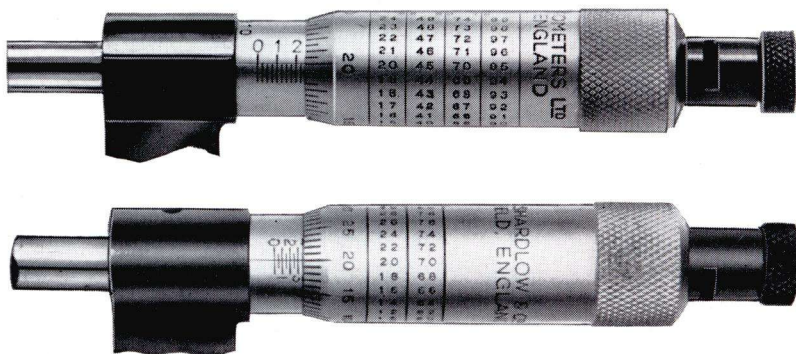
These micrometers have bow shaped alloy frames conforming to B.S. 870 for flexure of frame. A  $\frac{1}{16}$ " diameter thimble is fitted for easy reading. The interchangeable anvils are easily fitted and held in position by a knurled nut. The anvils are accurately positioned and each has an adjustment for wear. Adjustment can be made from the anvil end while retaining parallelism of the anvil and spindle faces.



## EXTERNAL MICROMETERS

### Check reading thimbles

The Shardlow check reading thimble is designed for quickness of operation. Removing the need for even the simple arithmetic required to use a micrometer, the check reading thimble checks at a glance the measurement being taken. Thimbles are available for both English and Metric instruments.



## EXTERNAL MICROMETERS

### Large thimbles

Any standard external micrometer 1" and over can be supplied with a  $\frac{3}{4}$ " diameter thimble, at extra cost. When ordering, add E before catalogue No.



**SHARDLOW**MICROMETERS



## EXTERNAL MICROMETERS

### with ball anvils

These tube-measuring micrometers are fitted with ratchet stops and locknuts.

These can be supplied with tungsten carbide tips at extra cost. Add T before catalogue No. when ordering. English calibrations can be supplied reading  $\cdot 0001''$  at extra cost. Add V to catalogue No.



1B has a matt chrome frame.

ENGLISH:  
 $\cdot 0005''$  graduations

Cat. No.	Capacity
50B	0-1"
1B	0-1"
5	0- $\frac{1}{2}$ "

METRIC:  
 $\cdot 01$  mm. graduations

Cat. No.	Capacity
50MB	0-25 mm.
1MB	0-25 mm.
5M	0-13 mm.

## EXTERNAL MICROMETERS

### with ball anvils and spindles

Fitted with ratchet stops and locknuts.

Tungsten carbide tips can be supplied at extra cost.

Add T before catalogue No. when ordering.

English calibrations can be supplied reading  $\cdot 0001''$  at extra cost. Add V to catalogue No.



1L has a matt chrome frame.

ENGLISH:  
 $\cdot 0005''$  graduations

Cat. No.	Capacity
50L	0-1"
1L	0-1"
8	0- $\frac{1}{2}$ "

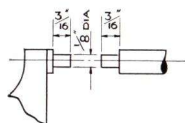
METRIC:  
 $\cdot 01$  mm. graduations

Cat. No.	Capacity
50ML	0-25 mm.
1ML	0-25 mm.
8M	0-13 mm.

## EXTERNAL MICROMETERS

### with spline anvils and spindles

Fitted with ratchet stops and locknuts.  
Tungsten carbide tips can be supplied at extra cost.  
Add T before catalogue No. when ordering.  
English calibrations can be supplied reading  $\cdot 0001''$   
at extra cost. Add V to catalogue No.



ENGLISH:  $\cdot 0005''$  graduations

Cat. No.	Capacity
50S	0- $\frac{3}{4}''$
51S	0-1"
52S	1-2"
1S	0- $\frac{3}{4}''$
2S	0-1"
3S	1-2"

METRIC:  $\cdot 01$  mm. graduations

Cat. No.	Capacity
50MS	0-19 mm.
51MS	0-25 mm.
52MS	25-50 mm.
1MS	0-19 mm.
2MS	0-25 mm.
3MS	25-50 mm.

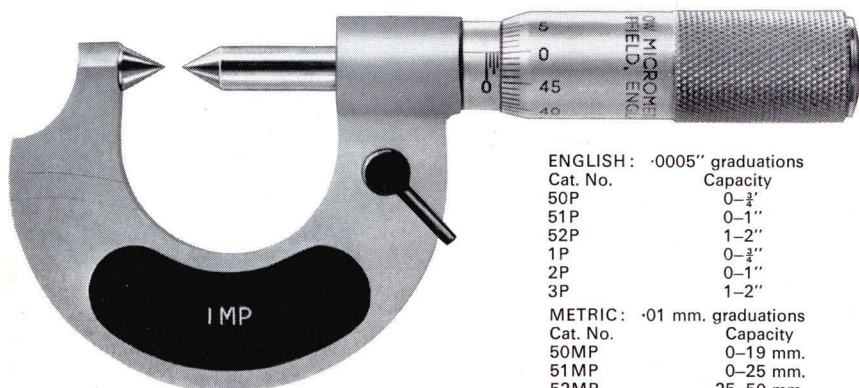
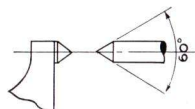
50S to 52S have black frames.

1S to 3S have matt chrome frames.

## EXTERNAL MICROMETERS

### with point anvils and spindles

Fitted with locknuts.  
Tungsten carbide tips can be supplied at extra cost.  
Add T before catalogue No. when ordering.  
English calibrations can be supplied reading  $\cdot 0001''$   
at extra cost. Add V to catalogue No.



ENGLISH:  $\cdot 0005''$  graduations

Cat. No.	Capacity
50P	0- $\frac{3}{4}''$
51P	0-1"
52P	1-2"
1P	0- $\frac{3}{4}''$
2P	0-1"
3P	1-2"

METRIC:  $\cdot 01$  mm. graduations

Cat. No.	Capacity
50MP	0-19 mm.
51MP	0-25 mm.
52MP	25-50 mm.
1MP	0-19 mm.
2MP	0-25 mm.
3MP	25-50 mm.

50P to 52P have black frames.

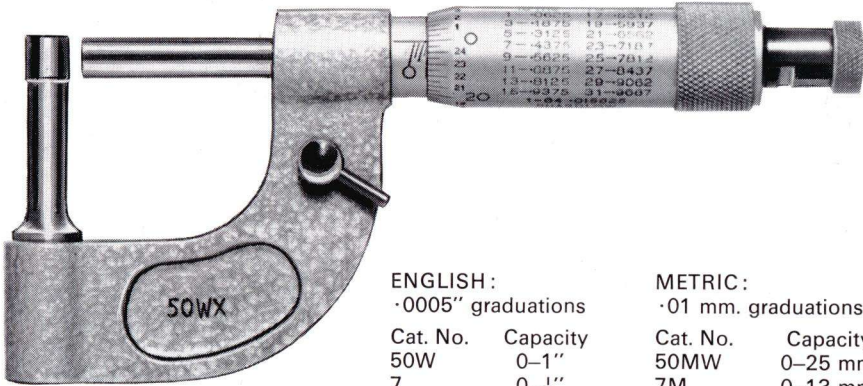
1P to 3P have matt chrome frames.



## EXTERNAL MICROMETERS

### with vertical anvils

These tube-measuring micrometers are fitted with ratchets and locknuts. 50W has a vertical anvil of 0.268" diameter. Anvil diameter of No. 7 is 0.203". English calibrations can be supplied reading .0001" at extra cost. Add V to catalogue No.



ENGLISH :  
·0005" graduations

Cat. No.	Capacity
50W	0-1"
7	0- $\frac{1}{2}$ "

METRIC :  
·01 mm. graduations

Cat. No.	Capacity
50MW	0-25 mm.
7M	0-13 mm.

## EXTERNAL MICROMETERS

### with disc anvils and spindles (paper micrometers)

These micrometers are fitted with ratchets and locknuts. 0-1" models have  $\frac{1}{2}$ " diameter discs. 0- $\frac{1}{2}$ " models have  $\frac{3}{8}$ " discs. English calibrations can be supplied to read to .0001" at extra cost. Add V to catalogue No.



ENGLISH :  
·0005" graduations

Cat. No.	Capacity
50D	0-1"
1D	0-1"
6	0- $\frac{1}{2}$ "

METRIC :  
·01 mm. graduations

Cat. No.	Capacity
50MD	0-25 mm.
1MD	0-25 mm.
6M	0-13 mm.

1D has a matt chrome frame.

## GEAR TOOTH MICROMETERS

### fitted with ratchet stops and locknuts

English calibrations can be supplied reading  $\cdot 0001''$  at extra cost. Add V to catalogue No.

#### $\frac{3}{4}''$ diameter anvils

##### ENGLISH:

$\cdot 0005''$  graduations

Cat. No.	Capacity
100	0-1"
101	1-2"
102	2-3"
103	3-4"
104	4-5"
105	5-6"

##### METRIC:

$\cdot 01$  mm. graduations

Cat. No.	Capacity
100M	0- 25 mm.
101M	25- 50 mm.
102M	50- 75 mm.
103M	75-100 mm.
104M	100-125 mm.
105M	125-150 mm.

#### 1" diameter anvils

##### ENGLISH:

$\cdot 0005''$  graduations

Cat. No.	Capacity
110	0-1"
111	1-2"
112	2-3"
113	3-4"
114	4-5"
115	5-6"

##### METRIC:

$\cdot 01$  mm. graduations

Cat. No.	Capacity
110M	0- 25 mm.
111M	25- 50 mm.
112M	50- 75 mm.
113M	75-100 mm.
114M	100-125 mm.
115M	125-150 mm.



## ROLLING MILL MICROMETERS

These deep frame micrometers are supplied with ratchet stop and locknut unless otherwise ordered. Disc anvils and spindles,  $\frac{1}{2}''$  diameter, can be supplied at extra cost. To order, add D to catalogue No. A ball anvil can be supplied if required, at extra cost. When ordering, add B to catalogue No. Rolling mill micrometers with a capacity greater than 1" are manufactured to your request. English calibrations can be supplied reading  $\cdot 0001''$  at extra cost. Add V to catalogue No.

##### ENGLISH: $\cdot 0005''$ graduations

Cat. No.	Capacity	Depth of frame
333	0-1"	3"
336	0-1"	6"
339	0-1"	9"

##### METRIC: $\cdot 01$ mm. graduations

Cat. No.	Capacity	Depth of frame
333M	0-25 mm.	3"
336M	0-25 mm.	6"
339M	0-25 mm.	9"



## VEE BLOCK MICROMETERS



These instruments have been designed for the accurate measurement of three-, five- and seven-flute drills, taps, reamers, etc. They eliminate the need for ring gauges and other costly and doubtful methods of measuring. They are particularly useful for measuring spherical objects such as steel balls.

The Vee Blocks are accurately ground and lapped.

ENGLISH: .001" graduations

METRIC: 01 mm. graduations

### 3 FLUTE

Cat. No.	Capacity	Cat. No.	Capacity
350	$\frac{1}{16}$ - $\frac{1}{2}$ "	350M	2- 13 mm.
351	$\frac{1}{8}$ - 1"	351M	13- 25 mm.
352	1 - 1 $\frac{1}{2}$ "	352M	25- 38 mm.
353	1 $\frac{1}{2}$ - 2"	353M	38- 50 mm.
354	2 - 2 $\frac{1}{2}$ "	354M	50- 63 mm.
355	2 $\frac{1}{2}$ - 3"	355M	63- 75 mm.
356	3 - 3 $\frac{1}{2}$ "	356M	75- 88 mm.
357	3 $\frac{1}{2}$ - 4"	357M	88-100 mm.

### 5 FLUTE

5/351	$\frac{1}{8}$ - 1"	5/351M	4- 25 mm.
5/352	1 - 2"	5/352M	25- 50 mm.
5/353	2 - 3"	5/353M	50- 75 mm.
5/354	3 - 4"	5/354M	75-100 mm.

### 7 FLUTE

7/351	$\frac{1}{8}$ - 1"	7/351M	4- 25 mm.
7/352	1 - 2"	7/352M	25- 50 mm.
7/353	2 - 3"	7/353M	50- 75 mm.
7/354	3 - 4"	7/354M	75-100 mm.

## END MEASURING MICROMETER SETS for jig boring machines, universal milling machines, etc.



Catalogue No. 600. The set consists of two micrometer heads and a series of rods: two off each 1", 2", 3" and 6", and one 12" rod.

The set is supplied in a fitted wooden case.

**These micrometers have a 1" spindle movement and are graduated to .0001"**

The rods are of non-shrinking material, hardened and lapped flat-ended to an accuracy of within .00005" in length. The movement of the micrometer heads is within the same limit of accuracy.

Location diameter of the micrometer heads and rods is .625". Corresponding metric sizes can be supplied. Special sets will be quoted on request.



## HUB MICROMETERS

This micrometer has a very narrow frame and is designed to pass through a 1" diameter hole. English calibrations can be supplied reading .0001" at extra cost. Add V to Catalogue No.



### ENGLISH :

.0005" graduations

Cat. No. Capacity

360 0-1"

361 1-2"

362 2-3"

363 3-4"

### METRIC :

.01 mm. graduations

Cat. No. Capacity

360M 0- 25 mm.

361M 25- 50 mm.

362M 50- 75 mm.

363M 75-100 mm

## TURBINE WEARDOWN GAUGES

These micrometers are intended primarily for measuring the wear of turbine bearings. A wide variety of designs and capacities can be supplied. Each gauge is supplied in a polished wooden case.



## SPECIAL FEATURES

### Tungsten carbide tips

The following micrometers can be supplied with tungsten carbide tips at extra cost :

Point anvil and spindle micrometers.

Spline anvil and spindle micrometers.

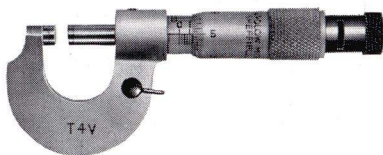
Ball anvil and spindle micrometers.

When ordering, add T before catalogue No.

### Large thimbles

Any of these micrometers, 1" and over, can be supplied with a  $\frac{3}{4}$ " diameter thimble at extra cost.

When ordering add E before catalogue No.



# SHARDLOW MICROMETERS

## INTERNAL MICROMETERS

### Capacities from 1 to 12"

ENGLISH: .0005" graduations

Cat. No. Capacity

440 1-2"

.25" movement of screw. .25" distance piece.  
One extension rod and auxiliary handle.

Cat. No. Capacity

441 1-3"

.25" movement of screw. .25" distance piece.  
Three extension rods and auxiliary handle.

Cat. No. Capacity

442 2-6"

.5" movement of screw. .5" distance piece.  
Three extension rods and auxiliary handle.

Cat. No. Capacity

443 2-8"

.5" movement of screw. .5" distance  
piece. Five extension rods and auxiliary  
handle.

Cat. No. Capacity

444 2-12"

.5" movement of screw. .5" distance  
piece. Nine extension rods and auxiliary  
handle.

The Shardlow internal micrometer consists of a measuring head, extension rods, spacing collars and in the ranges covering 1"—12" (25—300 mm.) an auxiliary handle. They are of a strong robust construction, yet are light and easy to handle. The anvils are radially ground and lapped after hardening. Each rod is provided with an adjustment for wear and conforms to B.S. 959 for accuracy and rigidity. Supplied in a velvet lined leatherette case. Graduated parts are matt chrome plated.



## INTERNAL MICROMETERS

### Capacities from 8 to 72"

ENGLISH: .0005" graduations

Cat. No. Capacity

445 8-32"

1" movement of screw. One 1" and two 2"  
distance pieces. Three extension rods.

Cat. No. Capacity

446 12-36"

1" movement of screw. One 1" and two 2"  
distance pieces. Three extension rods.

Cat. No. Capacity

447 12-48"

1" movement of screw. One 1" and two 2"  
distance pieces. Five extension rods.

Cat. No. Capacity

448 32-52"

1" movement of screw. Two 1" and one 2"  
distance pieces. Three extension rods.

Cat. No. Capacity

449 36-56"

1" movement of screw. Two 1" and one 2"  
distance pieces. Three extension rods.

Cat. No. Capacity

450 36-60"

1" movement of screw. One 1" and two 2"  
distance pieces. Three extension rods.

Cat. No. Capacity

451 52-72"

1" movement of screw. Two 1" and one 2"  
distance pieces. Three extension rods.

Of a strong robust construction, these instruments are light and easy to handle. The anvils are radially ground and lapped after hardening. Each rod is provided with an adjustment for wear, and conforms to B.S. 959 for accuracy and rigidity. Each micrometer is supplied in a wooden case. Graduated parts are matt chrome plated.



## INTERNAL MICROMETERS

### Capacities from 25 to 300 mm.

METRIC: .01 mm. graduations

Cat. No. Capacity  
440M 25- 50 mm.  
5 mm. movement of screw. 5 mm. distance  
piece. Two extension rods and auxiliary handle.

Cat. No. Capacity  
441M 25- 75 mm.  
5 mm. movement of screw. 5 mm. distance  
piece. Four extension rods and auxiliary handle.

Cat. No. Capacity  
442M 50-150 mm.  
13 mm. movement of screw. 12 mm. distance  
piece. Three extension rods and auxiliary handle.

Cat. No. Capacity  
443M 50-200 mm.  
13 mm. movement of screw. 12 mm. distance  
piece. Five extension rods and auxiliary handle.

Cat. No. Capacity  
444M 50-300 mm.  
13 mm. movement of screw. 12 mm. distance  
piece. Nine extension rods and auxiliary handle.

Of a strong robust construction, these instruments are light and easy to handle. The anvils are radially ground and lapped after hardening. Each rod is provided with an adjustment for wear, and conforms to B.S. 959 for accuracy and rigidity. Supplied in velvet lined leatherette case. Graduated parts are matt chrome plated.



## INTERNAL MICROMETERS

### Capacities from 200 to 1800 mm.

Of a strong robust construction, these instruments are light and easy to handle. The anvils are radially ground and lapped after hardening. Each rod is provided with an adjustment for wear and conforms to B.S. 959 for accuracy and rigidity. Supplied in a wooden case with hinged lid. Graduated parts are matt chrome plated.

METRIC: .01 mm. graduations

Description

Cat. No.	Capacity	Description
445M	200- 800 mm.	25 mm. movement of screw. One 25 mm. and two 50 mm. distance pieces. Three extension rods.
446M	300- 900 mm.	25 mm. movement of screw. One 25 mm. and two 50 mm. distance pieces. Three extension rods.
447M	300-1200 mm.	25 mm. movement of screw. One 25 mm. and two 50 mm. distance pieces. Five extension rods.
448M	800-1300 mm.	25 mm. movement of screw. Two 25 mm. and one 50 mm. distance pieces. Three extension rods.
449M	900-1400 mm.	25 mm. movement of screw. Two 25 mm. and one 50 mm. distance pieces. Three extension rods.
450M	900-1500 mm.	25 mm. movement of screw. One 25 mm. and two 50 mm. distance pieces. Three extension rods.
451M	1300-1800 mm.	25 mm. movement of screw. Two 25 mm. and one 50 mm. distance pieces. Three extension rods.





## TUBULAR INTERNAL MICROMETERS

### English Readings

ENGLISH: .0005" graduations

Cat. No.	Capacity in.	Cat. No.	Capacity in.
470	2- 2½	495	24-25
471	2½-3	496	25-26
472	3- 3½	497	26-27
473	3½-4	498	27-28
474	4- 4½	499	28-29
475	4½-5	500	29-30
476	5- 6	501	30-31
477	6- 7	502	31-32
478	7- 8	503	32-33
479	8- 9	504	33-34
480	9-10	505	34-35
481	10-11	506	35-36
482	11-12	507	36-37
483	12-13	508	37-38
484	13-14	509	38-39
485	14-15	510	39-40
486	15-16	511	40-41
487	16-17	512	41-42
488	17-18	513	42-43
489	18-19	514	43-44
490	19-20	515	44-45
491	20-21	516	45-46
492	21-22	517	46-47
493	22-23	518	47-48
494	23-24		

These instruments are of tubular construction and are strong, light and easy to handle. For instruments up to 18", tubing of ½" diameter is used. ¾" diameter tubing is used for instruments over 18". This ensures that the micrometers are rigid without being unduly heavy.

Measuring points are hardened, ground and lapped to a radius. Fibre grips are fitted, except on the two smallest instruments, to prevent expansion caused by the heat of the hand. An adjustment for wear is provided. The two smallest micrometers are supplied with auxiliary handles. These internal micrometers conform to B.S. 959. Graduated parts are matt chrome plated.

A set of thirteen instruments is available ranging from 2-12" in a wooden case. Catalogue No. 470/2.



## TUBULAR INTERNAL MICROMETERS

### Metric Readings

METRIC: .01 mm.

Cat. No.	Capacity mm.	Cat. No.	Capacity mm.
470M	50- 63	495M	600- 625
471M	63- 75	496M	625- 650
472M	75- 88	497M	650- 675
473M	88-100	498M	675- 700
474M	100-113	499M	700- 725
475M	113-125	500M	725- 750
476M	125-150	501M	750- 775
477M	150-175	502M	775- 800
478M	175-200	503M	800- 825
479M	200-225	504M	825- 850
480M	225-250	505M	850- 875
481M	250-275	506M	875- 900
482M	275-300	507M	900- 925
483M	300-325	508M	925- 950
484M	325-350	509M	950- 975
485M	350-375	510M	975-1000
486M	375-400	511M	1000-1025
487M	400-425	512M	1025-1050
488M	425-450	513M	1050-1075
489M	450-475	514M	1075-1100
490M	475-500	515M	1100-1125
491M	500-525	516M	1125-1150
492M	525-550	517M	1150-1175
493M	550-575	518M	1175-1200
494M	575-600		

These instruments are of tubular construction and are strong, light and easy to handle. For instruments up to 450 mm., tubing of ½" diameter is employed. ¾" diameter tubing is used for instruments over 450 mm. This ensures that the micrometers are rigid without being unduly heavy.

Measuring points are hardened, ground and lapped to a radius. Fibre grips are fitted, except on the two smallest instruments, to prevent expansion caused by the heat of the hand. An adjustment for wear is provided. The two smallest micrometers are supplied with auxiliary handles. Graduated parts are matt chrome plated.

A set of thirteen instruments is available, ranging from 50-300 mm. in a wooden case. Catalogue No. 470M/2.



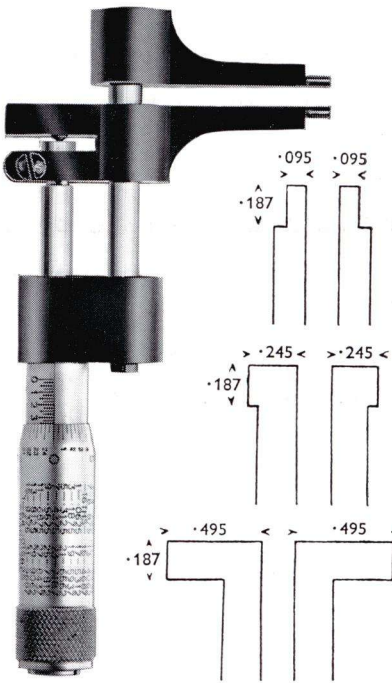
## INTERNAL MICROMETER CALIPERS

This highly successful instrument was developed to meet the demand for a micrometer to accurately measure small internal diameters. It has a hardened and thread-ground screw and a hardened and thread-ground plain spindle which eliminates the need for a keyway. The sliding jaw is lapped to ensure a good fit on the spindle. An adjustment for wear is provided.

This instrument is a great improvement on other micrometer calipers which have a keyway spindle allowing sideplay of the measuring jaws. On conventional micrometer calipers the reversed reading is confusing to the operator. Graduated parts are matt chrome plated.

English calibrations can be supplied reading  $\cdot 0001''$  at extra cost. Add V to catalogue No.

ENGLISH: $\cdot 0005''$ graduations		METRIC: $\cdot 01$ mm. graduations	
Cat. No.	Capacity	Cat. No.	Capacity
530	0-2-1"	530M	5-25 mm.
531	$\frac{1}{2}$ -1 $\frac{1}{2}$ "	531M	12-37 mm.
532	1-2"	532M	25-50 mm.



## DEPTH MICROMETERS

A dependable and practical instrument where precision depth measurement is required. The micrometer screw has a 1" (25 mm.) movement. The extension rods are  $\frac{3}{16}$ " diameter, the contact faces being hardened, ground and lapped flat to the axis. Each rod has an adjustment for wear, and is easily and quickly inserted into the micrometer through a hole in the screw, being held in position by the thimble cap. Graduated parts are matt chrome plated. The base—which is made in two sizes, 2  $\frac{1}{2}$ " and 4"—is hardened, ground and lapped flat.

The 0-1" and 0-25 mm. range are supplied with a fixed  $\cdot 268''$  diameter rod.

Depth micrometers are supplied with a ratchet stop at additional cost. Add R to catalogue No. when ordering. Rod locking screws are offered at extra cost. Add L to catalogue No. Depth micrometers with a greater length of base are supplied on request.



ENGLISH:  $\cdot 0005''$  graduations

Cat. No.	Capacity with 2 $\frac{1}{2}$ " base
410	0-1"
412	0-3"
414	0-6"
415	0-9"

Cat. No.	Capacity with 4" base
420	0-1"
422	0-3"
424	0-6"
425	0-9"
426	0-12"

METRIC:  $\cdot 01$  graduations

Cat. No.	Capacity with 4" base
410M	0-25 mm.
412M	0- 75 mm.
414M	0-150 mm.
415M	0-225 mm.

Cat. No.	Capacity with 4" base
420M	0- 25 mm.
422M	0- 75 mm.
424M	0-150 mm.
425M	0-225 mm.
426M	0-300 mm.



## MICROMETER HEADS 0- $\frac{1}{2}$ " 0-13 mm.

These instruments are designed to be incorporated in special gauges, fixtures or machines, for fine measurements and adjustment. They conform to the relevant B.S. specifications. Graduated parts are matt chrome plated.

The locating shank or boss is  $\frac{3}{8}$ " diameter by  $\frac{3}{8}$ " long. The spindle projects  $\frac{3}{8}$ " when in the zero position. The spindle diameter is .203". Tungsten carbide tips are supplied at extra cost. Add T before catalogue No. when ordering. Special heads can be made to your requirements.



ENGLISH Cat. No.	Capacity	METRIC Cat. No.	Capacity	Description
379	0- $\frac{1}{2}$ "	379M	0-13 mm.	Ratchet and spindle lock screw. Reading .0005" ( .01 mm.).
379D	0- $\frac{1}{2}$ "	379MD	0-13 mm.	As 379 but with depth scale readings.
379L	0- $\frac{1}{2}$ "	379ML	0-13 mm.	As 379 but with left hand readings.
379V	0- $\frac{1}{2}$ "	—	—	As 379 but with .0001" readings.
380	0- $\frac{1}{2}$ "	380M	0-13 mm.	Reading .0005" ( .01 mm.).
380D	0- $\frac{1}{2}$ "	380MD	0-13 mm.	As 380 but with depth scale readings.
380L	0- $\frac{1}{2}$ "	380ML	0-13 mm.	As 380 but with left hand readings.
380V	0- $\frac{1}{2}$ "	—	—	As 380 but with .0001" readings.

## MICROMETER HEADS 0-1" 0-25 mm.

The locating shank or boss is  $\frac{1}{2}$ " diameter by  $\frac{3}{4}$ " long. The spindle projects  $1\frac{1}{8}$ " when in the zero position. Supplied with tungsten carbide tips if required, at extra cost. Add T before catalogue No. when ordering. Special heads can be made to your requirements.



ENGLISH Cat. No.	Capacity	METRIC Cat. No.	Capacity	Description
381	0-1"	381M	0-25 mm.	Reading .0005" ( .01 mm.).
381D	0-1"	381MD	0-25 mm.	As 381 but with depth scale reading
381L	0-1"	381ML	0-25 mm.	As 381 but with left hand reading.
381V	0-1"	—	—	As 381 but with .0001" reading
382	0-1"	382M	0-25 mm.	Ratchet and spindle lock screw. Reading .0005" ( .01 mm.).
382D	0-1"	382MD	0-25 mm.	As 382 but with depth scale reading.
382L	0-1"	382ML	0-25 mm.	As 382 but with left hand reading.
382V	0-1"	—	—	As 382 but with .0001" reading.

## MICROMETER HEADS 0-2" 0-50 mm.

The locating shank or boss is  $\frac{1}{2}$ " diameter by  $\frac{3}{4}$ " long. The spindle projects  $2\frac{1}{8}$ " when in the zero position. These Micrometer Heads are similar to Nos. 381 and 382.

ENGLISH Cat. No.	Capacity	METRIC Cat. No.	Capacity	Description
3812	0-2"	3812M	0-50 mm.	Reading .0005" ( .01 mm.).
3812D	0-2"	3812MD	0-50 mm.	As 3812 but with depth scale reading.
3812L	0-2"	3812ML	0-50 mm.	As 3812 but with left hand reading
3822	0-2"	3822M	0-50 mm.	Ratchet and spindle lock screw. Reading .0005" ( .01 mm.).
3822D	0-2"	3822MD	0-50 mm.	As 3822 but with depth scale reading.
3822L	0-2"	3822ML	0-50 mm.	As 3822 but with left hand reading.



## MICROMETER HEADS

### with large thimbles

#### No. 383:

The locating shank or boss is  $\frac{3}{4}$ " diameter by  $\frac{3}{4}$ " long. The thimble diameter is  $\frac{1}{8}$ " and the spindle diameter is .268". The spindle projects  $1\frac{1}{4}$ " when in the zero position.

#### No. 402:

The locating shank or boss is  $\frac{1}{2}$ " diameter by  $\frac{3}{4}$ " long. The thimble diameter is 2" and the spindle diameter is .268". The spindle projects  $1\frac{1}{4}$ " when in the zero position.

#### No. 403:

The locating shank or boss is  $\frac{1}{2}$ " diameter by  $\frac{3}{4}$ " long. The thimble diameter is 3" and the spindle diameter is .268". The spindle projects  $1\frac{1}{4}$ " when in the zero position.

#### No. 404:

The locating shank or boss is  $\frac{1}{2}$ " diameter by  $\frac{3}{4}$ " long. The thimble diameter is  $2\frac{5}{8}$ " and the spindle diameter is .268". The spindle projects  $1\frac{1}{4}$ " when in the zero position.



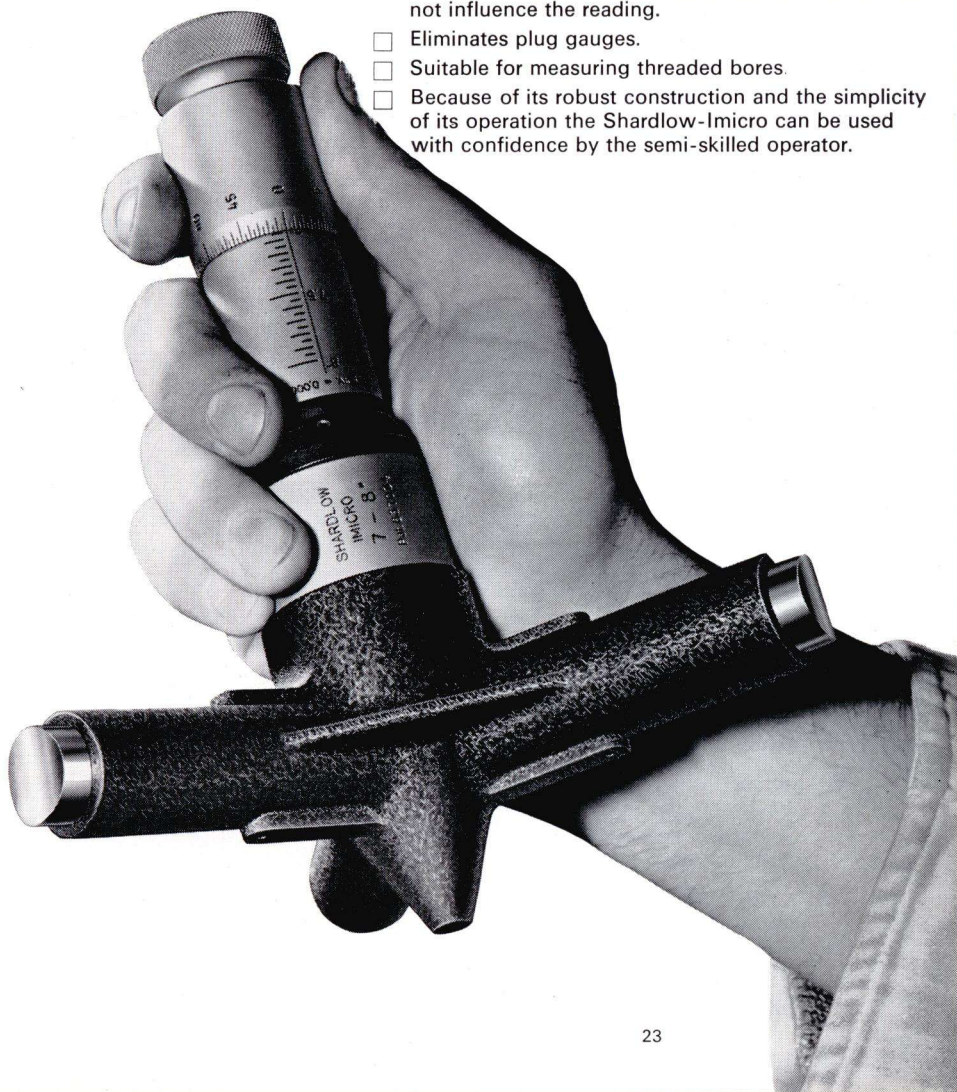
Supplied with tungsten carbide tips at extra cost. Add T before catalogue No. Special heads can be made to your requirements. Micrometer heads with non-rotating spindles can be supplied.

ENGLISH:		METRIC:		Description
Cat. No.	Capacity	Cat. No.	Capacity	
383	0-1"	383M	0-25 mm.	Reading .0005" ( .01 mm.)
383D	0-1"	383DM	0-25 mm.	As 383 but with depth scale reading.
383L	0-1"	383ML	0-25 mm.	As 383 but with left hand reading.
383V	0-1"	—	—	As 383 but with .0001" reading.
402	0-1"	402M	0-25 mm.	Reading direct to .0001" ( .002 mm.).
4022	0-2"	4022M	0-25 mm.	Reading direct to .0001" ( .002 mm.).
403	0-1"	403M	0-25 mm.	Reading direct to .0001" ( .002 mm.).
404	0-1"	404M	0-25 mm.	Reading direct to .0001" ( .002 mm.).

**SHARDLOW**MICROMETERS

## SAVE TIME AND MONEY WITH SHARDLOW-IMICRO

- ☐ High degree of accuracy—simple and rapid to use.
- ☐ No parts to be changed—always ready to use.
- ☐ Economical—measuring instead of comparing saves time, eliminates rejects. Several operators can use the instruments of any one set at the same time.
- ☐ Two or three setting rings only are required for the complete range of each set. These give an easy check on the wear of the feeler bolts. Compensation for wear and resetting are the work of a moment.
- ☐ Recessed bores can be measured, depending on size of recess.
- ☐ An extension is provided for deep bores—extension does not affect accuracy.
- ☐ Normal changes of temperature due to hand heat do not influence the reading.
- ☐ Eliminates plug gauges.
- ☐ Suitable for measuring threaded bores.
- ☐ Because of its robust construction and the simplicity of its operation the Shardlow-Imicro can be used with confidence by the semi-skilled operator.





## UNMATCHED FOR ACCURACY— UNRIVALLED FOR EASE OF OPERATION

Internal measurement has always presented problems. Two-point internal micrometers requires special skill in finding true centres and takes time on small diameters while plug gauges are subject to rapid wear, need constant checking and only compare instead of measuring directly. The Shardlow-Imicro answers the definite need for a direct measuring instrument of high precision and robust construction which is adjustable for wear.

### Threaded cone

A hardened thread-ground conic spiral is the heart of the Shardlow-Imicro. Three feeler bolts are held in constant contact with the cone by means of return springs. The spiral of the feeler bolts is ground at right angles to the cone axis to eliminate side thrust and reduce friction. A spindle connects the cone to a thimble, rotation of which causes the feeler bolts to contact the wall being measured. The cone is advanced by a displacement thread of equal pitch on its parallel portion. This reduces wear of the cone. All measuring parts are precision ground and made of non-shrinking wear-resistant steel, specially treated for long life.

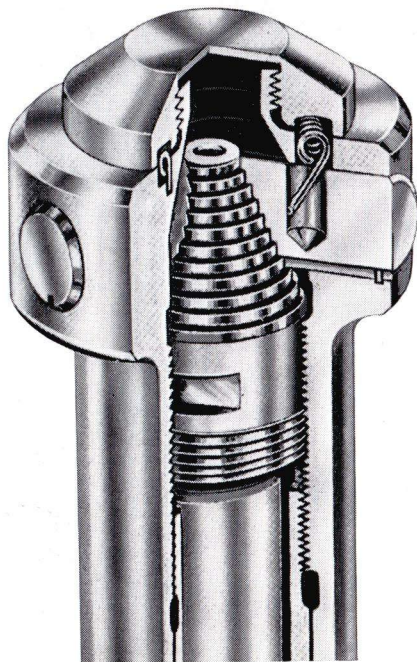
### Direct measuring

As the thimble is integral with the cone through the spindle, no transmission parts, such as micrometer screws, are necessary—making the instrument a direct measuring one. The cylindrically ground contact faces of the feelers are spaced at 120 degrees so that the instrument is self-centred and self-aligned and uses the maximum centring force.

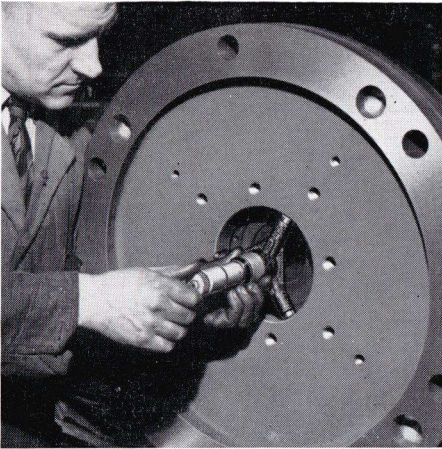
The Shardlow-Imicro contacts the bore not at three points but on three lines. Because of the line contact it always finds the correct measuring position and the longitudinal vibrations caused by the ratchet stop will automatically cause it to make a firm contact with the walls of the bore.

### Measurement of holes and bores

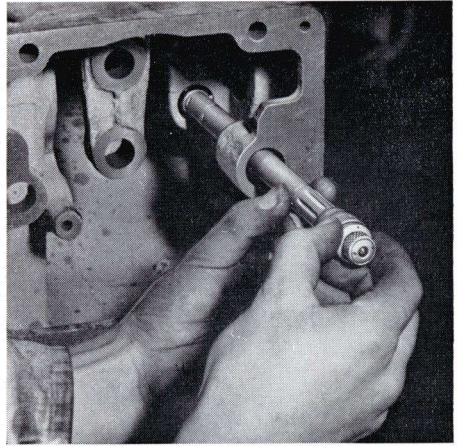
Supplied with each set, a simple extension allows the measurement of deep bores and holes. The extension, even when several units are coupled together, does not influence the accuracy of the instrument. Recessed bores can be measured with standard or specially adapted instruments, depending on the depth and width of the recess.







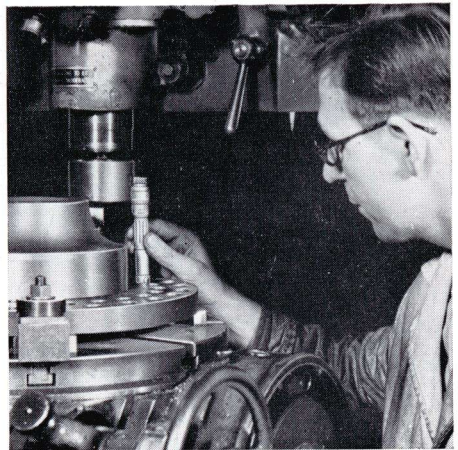
The ease of rapid, repeated and accurate measurement of the workpiece in the machine tool saves time and rejects and avoids faulty workmanship.



The extension allows measurement in deep bores. The Shardlow-Imicro measures accurately without the need of shaking or swinging it into the bore.



Shardlow-Imicro is ideal for rapid and production inspection. A single instrument can be used for bores of various sizes, replacing a large number of plug gauges.



In quantity production the operator is able to detect any tool wear and take immediate steps.

# INDIVIDUAL INSTRUMENTS AND ACCESSORIES

## ENGLISH: graduations

1911	.275— .350"
1912	.350— .425"
1913	.425— .500"
1914	.350" dia. setting ring
1915	.425" dia. setting ring
1916	Extension rod
1917	Individual case
1921	.500— .600"
1922	.600— .700"
1923	.700— .800"
1924	.500" dia. setting ring
1925	.700" dia. setting ring
1926	Extension rod
1927	Individual case
1931	.800—1 .000"
1932	1 .000—1 .200"
1933	1 .200—1 .400"
1934	1 .400—1 .600"
1935	1 .000" dia. setting ring
1936	1 .400" dia. setting ring
1937	Extension rod
1938	Individual case
1941	1 .600—2 .000"
1942	2 .000—2 .400"
1943	2 .400—2 .800"
1944	2 .800—3 .200"
1945	3 .200—3 .600"
1946	3 .600—4 .000"
1947	2 .000" dia. setting ring
1948	2 .800" dia. setting ring
1949	3 .600" dia. setting ring
1950	Extension rod
1950A	Individual case
1951	4 .000—5 .000"
1952	5 .000—6 .000"
1953	6 .000—7 .000"
1954	7 .000—8 .000"
1955	5 .000" dia. setting ring
1956	7 .000" dia. setting ring
1957	Extension rod
1958	Individual case
1961	8 .000— 9 .000"
1962	9 .000—10 .000"
1963	10 .000—11 .000"
1964	11 .000—12 .000"
1965	9" dia. setting frame
1966	11" dia. setting frame
1967	9" and 11" dia. setting frame
1968	Extension rod
1969	Individual case

## METRIC: graduations

911	6— 8 mm.
912	8—10 mm.
913	10—12 mm.
914	8 mm. dia. setting ring
915	10 mm. dia. setting ring
916	Extension rod
917	Individual case
921	11—14 mm.
922	14—17 mm.
923	17—20 mm.
924	11 mm. dia. setting ring
925	17 mm. dia. setting ring
926	Extension rod
927	Individual case
931	20—25 mm.
932	25—30 mm.
933	30—35 mm.
934	35—40 mm.
935	25 mm. dia. setting ring
936	35 mm. dia. setting ring
937	Extension rod
938	Individual case
941	40— 50 mm.
942	50— 60 mm.
943	60— 70 mm.
944	70— 80 mm.
945	80— 90 mm.
946	90—100 mm.
947	50 mm. dia. setting ring
948	70 mm. dia. setting ring
949	90 mm. dia. setting ring
950	Extension rod
950A	Individual case
951	100—125 mm.
952	125—150 mm.
953	150—175 mm.
954	175—200 mm.
955	125 mm. dia. setting ring
956	175 mm. dia. setting ring
957	Extension rod
958	Individual case
961	200—225 mm.
962	225—250 mm.
963	250—275 mm.
964	275—300 mm.
965	225 mm. dia. setting frame
966	275 mm. dia. setting frame
967	225 and 275 mm. dia. setting frame
968	Extension rod
969	Individual case





## BOXED SETS

### ENGLISH: graduations

Cat. No.	Range	Number of Instruments	Capacity of each instrument	Graduations
1091	.275— .500"	3	.075"	.0001"
1092	.500— .800"	3	.100"	.0002"
1093	.800—1 .600"	4	.200"	.0002"
1094	1 .600—4 .000"	6	.400"	.0002"
1095	4 .000—8 .000"	4	1 .000"	.0005"

Due to the wide spacing on the thimbles of sets 1092 to 1095, readings can be estimated to half a division, i.e. .0001" on sets 1092 to 1094 and .00025 on sets 1095.

### METRIC: graduations

Cat. No.	Range	Number of instruments	Capacity of each instrument	Graduations
91	6— 12 mm.	3	2 mm.	.001 mm. with vernier
92	11— 20 mm.	3	3 mm.	.005 mm.
93	20— 40 mm.	4	5 mm.	.005 mm.
94	40—100 mm.	6	10 mm.	.005 mm.
95	100—200 mm.	4	25 mm.	.01 mm.



## EXTENSION RODS FOR DEEP BORES

Deep and not readily accessible bores can be measured with the Shardlow-Imicro without influencing the accuracy. This table shows the depth to which bores can be measured with various extension rods. Special extensions will be quoted for on request.

Set No.	1091	1092	1093	1094	1095
Range	.275— .500"	.500— .800"	8 .00— 1 .600"	1 .600— 4 .000"	4 .000— 8 .000"
Measuring depth without extension	2"	3"	3"	3"	4"
Measuring depth with 1 standard extension	6"	9"	9"	9"	10"
Measuring depth with 2 standard extensions	10"	15"	15"	15"	16"
Measuring depth with special extension rod 20"	—	—	23"	23"	24"
Measuring depth with special extension rod 40"	—	—	43"	43"	44"



## USING THE SHARDLOW-IMICRO

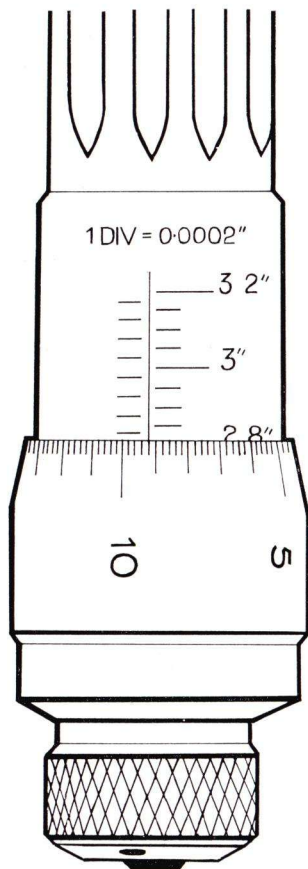
Setting rings are supplied with each set to check the instrument's accuracy. Re-setting of the instrument, as well as compensation for feeler bolt wear—which only occurs after long use—can be effected in a very simple manner.

In order to reduce effect of variations in different operators' touch, an ingenious ratchet arrangement limits the measuring pressure automatically. The ratchet arrangement also creates a slight vibration causing the maximum degree of contact between the feeler bolts and the bore.

The Shardlow-Imicro does not need to be moved to and fro in the bore, as is done with plug and other gauges. Hence the wear of the instrument is less and the instrument will continue to give good service over many years.

### Easy to operate

Operation of the Shardlow-Imicro is very simple. The instrument is introduced into the bore, the ratchet is turned until it disengages, and the reading can be made directly.



Reading the Shardlow-Imicro is straightforward. Example here is shown reading 2.8092".

## SHARDLOW MICROMETERS

## VERNIER HEIGHT GAUGES



Shardlow vernier height gauges are fitted with flush-fitting vernier scales to avoid parallax and allow rapid readings to be made with complete assurance.

These scales are 2.45" long on the English instrument, and 49 mm. on the metric. (On height gauges with a graduated bevelled edge there is always a thickness to the edge and errors in reading arise from the eye having to travel over this edge before meeting the graduations on the main scale).

Vernier scales for both English and Metric are adjustable. Accuracy of setting can be checked by the gauge block supplied.

Controls for the movement of the sliding head are grouped to facilitate easy operation and can be conveniently operated with one hand. A rack and pinion govern the coarse movement. Fine movement is governed by a worm movement.

To eliminate any side play of the sliding head, the clamping screws are fitted with spring loaded pads.

*Shardlow height gauges conform to B.S. 1943.*

CLAMPING SCREWS  
WITH SPRING LOADED PADS

LEVER FOR ENGAGING FINE  
TRAVERSE

FINE SETTING CONTROL

CLAMPING SCREWS WITH  
SPRING LOADED PADS

RAPID TRAVERSE KNOB

## VERNIER HEIGHT GAUGES

Flush fitting vernier scales to eliminate parallax and avoid errors of setting and reading.

Sliding vernier head has rapid traverse with geared fine movement for final setting.

Exceptionally clear graduations and matt chrome finish ensure easy accurate reading under all lighting conditions.

### Range

	ENGLISH :	METRIC :
Model	·001" graduations	·02 mm. graduations
1000	12"	320 mm.
1001	18"	470 mm.
1002	24"	640 mm.
1003	36"	920 mm.

Additional accessories for clamping of indicators and an offset scribe can be provided at extra cost.

Shardlow 12" height gauges are supplied in a velvet-lined leatherette case; 18", 24", and 36" instruments are supplied in a robust, hinged-lid wooden case.

Each is furnished with a scribe, a hardened rod for depth measurements and a 2" gauge block for checking purposes.

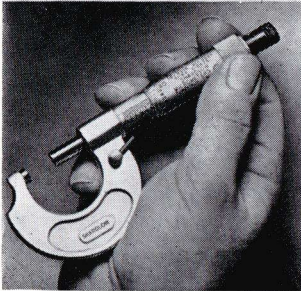
**SHARDLOW**MICROMETERS



# EDUCATIONAL AIDS

## How to read micrometers

an introduction to precision measuring instruments



The graduated line along the sleeve length is termed the sleeve line. The major division along the line (0, 1, 2, 3, 4, 5) represents parts of an inch; the subdivisions represent hundredths (0.0001 in.). On the top graduation the thimble is shown to lie after the second division following number 2, so that the reading is more correct than 0.200 in. The thimble divisions represent thousandths of an inch. A reading is taken on the thimble when it meets the datum line. In this case a reading of five thou. is shown and this value must be added to the sleeve reading. An increment in the table that gives a total of 0.205 in.



A factor is provided on cone measurements. This helps the instrument to be set reading and is used by micrometers to report measurements above to give a direct measurement. On some micrometers a table of direct measurements is stamped on the frame or the thimble so that factors such as zero length can be readily corrected.

**Reading to one half-thousandth of an inch**

Readings are taken on the sleeve and thimble. The sleeve reading is taken as before. The example shown left shows the thimble to lie after the first subdivision following number 2, so that the reading is more correct than 0.200 in. The thimble divisions represent thousandths of an inch. A reading is taken from the thimble when it meets the datum line. In this case a reading is indicated of five and a half thou. This is added to the sleeve reading of 0.20 in. so that the reading is 0.205 in. as shown in the table.



Five thou. turned around (thimble) 1, 2, 3, 4, 5 (in parallel to the datum line). The reading is taken as usual to the nearest half-thou. (0.20 in.) must measure the sleeve line and not read directly with the thimble divisions. In this case, after the datum line has been read, the thimble divisions, the datum line should be taken. It is now necessary to read which value line indicates exactly with a thimble division. The reading of this value line gives the number of turns of a screw or an added to the sleeve reading. In this example, the sleeve reading is 0.20 in., the thimble reading is 0.005 in., the normal reading is 0.205 in. The value is 0.205 in.



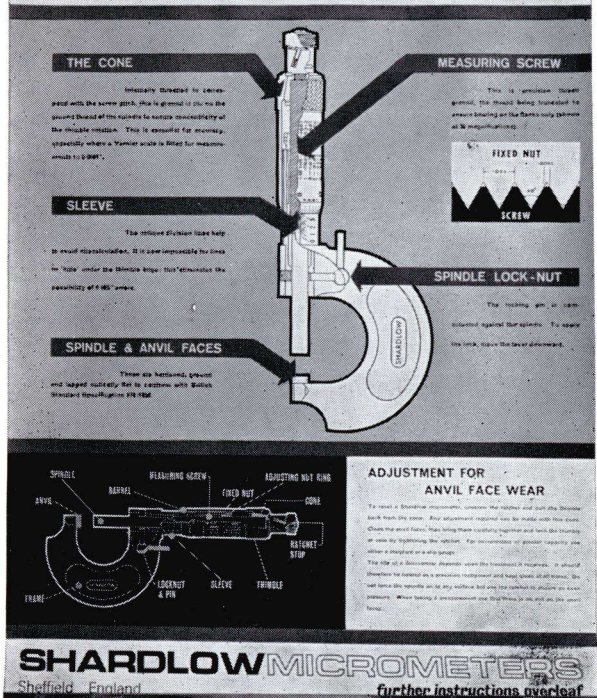
## How to read micrometers

This attractive booklet fills the long-felt need for a comprehensive introduction to the use of precision measuring instruments. The straightforward text is backed by clear illustrations and covers micrometers, height gauges, vernier protractors, etc. Available free by return of post. Copies are offered in quantity to teachers and instructors.

## Wallchart

This instructive wallchart shows the construction and operation of the micrometer while the reverse side explains in plain English how to read a micrometer to one 'thou', half a 'thou' and to one tenth of a 'thou'. Available free by return of post to teachers and instructors.

## SHARDLOW MICROMETERS instruction sheet



# SHARDLOW MICROMETERS

P.O. Box 62, Petre Street Sheffield 4. Phone: 386951. Grams: "Micrometers", Sheffield

SM/6

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